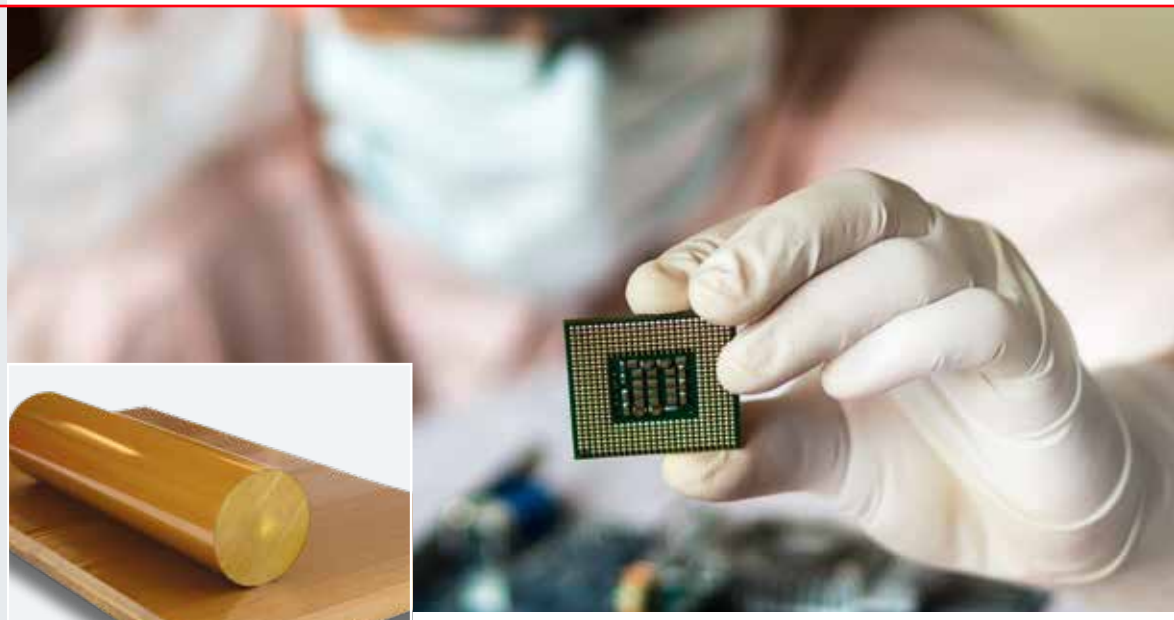
Semitron® MPR1000



Why Semitron® MPR1000?

- Enhanced PAI formula
- Low ionic content & low out-gassing
- Excellent heat resistance
- Minimized rate of erosion in plasma chambers
- Optimal chip resistance, durability, and machinability
- Designed specifically for demanding chamber applications

Recommended applications

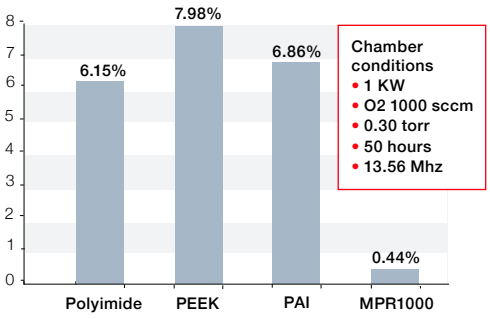
- Vacuum chambers that utilize oxygen plasma
- Clamp rings, trench rings, hangers, screw pins, and shower heads
- Centering pins, focus rings, insulators, vacuum pads, and wafer guides

Clean, resistant and optimized material solution for vacuum chambers

Semitron® MPR1000 possesses excellent heat resistance and low rates of erosion in plasma chambers. Due to these characteristics, it is often chosen for vacuum chamber applications within etch, CVD, and ion implant sub segmentations in the semiconductor and electronics industry.

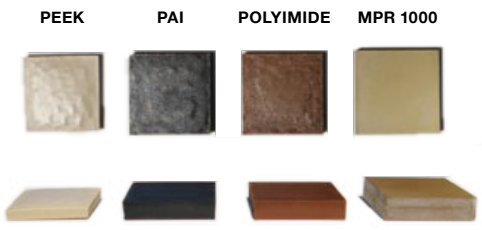
The product shows increased lifetime over traditional materials such as polyimide, for example up to 25x over polyimide in ozone in some cases, and is often specified against traditional materials used in vacuum chamber applications such as quartz, ceramics, polyimides and other engineering plastics, as MPR1000 lasts much longer over time.

Percent weight loss in oxygen plasma - Lower energy



Semitron® MPR1000 has less than 0.5% erosion in 1KW O2, 13x better than PI

2KW O2 plasma samples - Displays mass loss - All samples started at approximately the same size



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Semitron® MPR1000

		ISO*			ASTM*		
		Test methods	Units	Indicative values	Test methods	Units	Indicative values
Thermal Properties	Melting temperature (DSC, 10°C (50°F) / min)	ISO 11357-1/-3	°C	-	ASTM D3418	°F	-
	Glass transition temperature (DMA, tan delta)	DMA	°C	277	DMA	°F	527
	Thermal conductivity at 23°C (73°F)	-	W/(K.m)	0.5	-	BTU in./(hr.ft².°F)	3.54
	Coefficient of linear thermal expansion (-40 to 150 °C) (-40 to 300°F)				ASTM E-831 (TMA)	µin./in./°F	15
	Coefficient of linear thermal expansion (23 to 100°C) (73°F to 210°F)	-	µm/(m.K)	29			
	Coefficient of linear thermal expansion (23 to 150°C) (73°F to 300°F)	-	µm/(m.K)	30			
	Coefficient of linear thermal expansion (>150°C) (> 300°F) -	-	µm/(m.K)	36			
	Heat Deflection Temperature: method A: 1.8 MPa (264 PSI)	ISO 75-1/-2	°C	278	ASTM D648	°F	534
	Continuous allowable service temperature in air (20.000 hrs)	-	°C	260	-	°F	500
	Min. service temperature	-	°C	-	-	°F	-
	Flammability: UL 94 (3 mm (1/8 in.))	-	-	V-0	-	-	V-0
	Flammability: Oxygen Index	ISO 4589-1/-2	%				
Mechanical Properties	Tensile strength	ISO 527-1/-2	MPa	99	ASTM D638	PSI	15,000
	Tensile strain (elongation) at yield	ISO 527-1/-2	%	-	ASTM D638	%	-
	Tensile strain (elongation) at break	ISO 527-1/-2	%	3.5	ASTM D638	%	5
	Tensile modulus of elasticity	ISO 527-1/-2	MPa	6,050	ASTM D638	KSI	1,000
	Shear Strength	ASTM D732	MPa	83	ASTM D732	PSI	12,000
	Compressive stress at 1 / 2 / 5 % nominal strain	ISO 604	MPa	47/ 79/ 130			
	Compressive strength				ASTM D695	PSI	24,000
	Charpy impact strength - unnotched	ISO 179-1/1eU	kJ/m²	62.0			
	Charpy impact strength - notched	ISO 179-1/1eA	kJ/m²	5.0			
	Izod Impact notched				ASTM D256	ft.lb./in	1.30
	Flexural strength	ISO 178	MPa	-	ASTM D790	PSI	25,000
	Flexural modulus of elasticity	ISO 178	MPa	-	ASTM D790	KSI	1,100
	Rockwell M hardness	ISO 2039-2	-	102	ASTM D785	-	106
	Rockwell R Hardness	ISO 2039-2	-		ASTM D2240	-	
Electrical Properties	Electric strength	IEC 60243-1	kV/mm	-	ASTM D149	Volts/mil	570
	Volume resistivity	IEC 62631-3-1	Ohm.cm		IEC 60093	Ohm.cm	
	Surface resistivity	ANSI/ESD STM 11.11	Ohm/sq.		ANSI/ESD STM 11.11	Ohm/sq.	10E12
	Dielectric constant at 1 MHz	IEC 62631-2-1	-	-	ASTM D150	-	3.68
	Dissipation factor at 1 MHz	IEC 62631-2-1	-	-	ASTM D150	-	0.0080
Miscellaneous	Colour	-	-	Yellowish Brown	-	-	Yellowish Brown
	Density	ISO 1183-1	g/cm³	1.47			
	Specific Gravity				ASTM D792	-	1.48
	Water absorption after 24h immersion in water of 23°C (73°F)	ISO 62	%	0.28	ASTM D570	%	0.28
	Water absorption at saturation in water of 23 °C (73°F)	-	%	3.4	ASTM D570	%	3.4
	Wear rate	ISO 7148-2	µm/km	-	QTM 55010	$in^3.min/ft.lbs.hrx10^{-10}$	-
	Dynamic Coefficient of Friction (-)	ISO 7148-2	-		QTM 55007	-	-
	Limiting PV at 100 FPM				QTM 55007	ft.lbs/in².min	6,000
	Limiting PV at 0.1 / 1 m/s cylindrical sleeve bearings	-	Mpa.m/s	- / -			
	Chemical Resistance	https://www.mcam.com/en/support/chemical-resistance-information/			https://www.mcam.com/en/support/chemical-resistance-information/		

Note: 1 g/cm³ = 1,000 kg/m³ ; 1 MPa = 1 N/mm² ; 1 kV/mm = 1 MV/m NYP: there is no yield point

*This table, mainly to be used for comparison purposes, is a valuable help in the choice of a material. The data listed here fall within the normal range of product properties of dry material. However, they are not guaranteed and they should not be used to establish material specification limits nor used alone as the basis of design. This product data sheet and any data and specifications presented on our website shall provide promotional and general information about the Engineering Plastic Products (the "Products") manufactured and offered by Mitsubishi Chemical Advanced Materials and shall serve as a preliminary guide. All data and descriptions relating to the Products are of an indicative nature only. Neither this data sheet nor any data and specifications presented on our website shall create or be implied to create any legal or contractual obligation.

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